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A METHOD TO CONSTRUCT LOW-COST PONDS FOR AQUACULTURE

JOHN T. OGLE
Fisheries Section, Gulf Coast Research Laboratory, P.O. Box 7000, Ocean Springs, Mississippi 39564

ABSTRACT A 100 m² pond was constructed using a vinyl liner supported by hog wire panels shackled together in a circle. The construction was completed in one afternoon at a total cost of $612.00.

Introduction

Shrimp aquaculture in the United States is growing. In 1985, there were 17 farms with an expected production of 226,796 kg (Pruder *et al.* 1985). These farms utilized dirt ponds ranging from 26 m² to 809 ha and produced yields of 567 kg to 2,268 kg per ha. In 1989, there were 35 farms with an expected production of 907,184 kg (Rosenberry 1989). Although the size of ponds being utilized has decreased, yields have increased. Experimental yields of 9,120 kg/ha/crop (Wyban *et al.* 1988) to 12,680 kg/ha/crop (Sandifer *et al.* 1988) have been achieved. Such yields demand a high degree of management requiring small ponds that are expensive to build. The high water exchange and supplemental aeration required to sustain such yields result in a high water velocity requiring gravel, granite or solid walls to prevent pond erosion.

Vinyl-lined tanks and ponds (Bray *et al.* 1990, Pruder pers. comm.) recently have been shown to allow satisfactory growth of a marine shrimp, *Penaeus vannamei*. The use of vinyl-lined raceways has been reported (Salman *et al.* 1983) and are available commercially (Fastank, Antrim, N. Ireland). Completely self-supporting tanks up to 7 m in diameter are also available (Funny Pool, Settler Textilwerke, Graz, Austria). The use of metal (Woods, et al. 1981) and wood (Anon 1989) for supporting vinyl liners in above ground pools have been reported. These supports are available commercially in round (Aquatic Ecosystems, Inc., Apopka, Fla.) or square configurations (Modutank, Inc., Long Island, N.Y.). Plastic and metal wall supports are also readily available as 3.6 m diameter plastic swimming pools from major discount retailers.

An important consideration in the use of vinyl-lined tanks is the cost-per-unit volume. Although small tanks are readily available at low costs, larger tanks are more difficult to support structurally and are often expensive to construct. In an effort to lower the cost of constructing vinyl lined tanks, experimental use of hog wire panels as a means of supporting the tank was employed. A 100 m² tank was constructed at a total cost of $612.00.

Materials and Methods

A vinyl-lined pond was constructed using hog wire for wall panels. Hog wire is available in 81.3 cm by 4.6 m panels constructed of 4-gauge wire. Vertical wires are equally spaced every 20.3 cm. Eleven horizontal wires are unequally spaced increasing from 5.08 cm at the bottom to 15.24 cm at the top. This is ideal for supporting vinyl tanks as expansion force increases with depth and more support is needed at the bottom. Any number of these panels can be connected together by overlapping panels 20.3 cm and securing them with 0.3 cm cable clamps to form a self supporting circle. A pond of 100 m² surface area required 8 panels. Unlike other lined tanks, no berming was required at the inside perimeter. Dirt under the tank was contoured to produce a slope toward the tank center with no loss of depth at the periphery. A permalon liner (Aquatic Ecosystems, Inc., Apopka, Fla.) prefabricated for the diameter was purchased and installed. The tank required four hours to assemble and cost $612.00.

Discussion

The use of hog wire panels for inexpensive pond construction should prove to be a benefit for aquaculture of a variety of animals. For shrimp aquaculture, it would allow production in areas where normal dirt pond construction is either impossible or too expensive. This type of pond can be readily disassembled and moved if necessary.

Further studies to determine the upper size limit of ponds constructed using the described technique is encouraged.

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